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No. 92

Edited by C. Alan Ford

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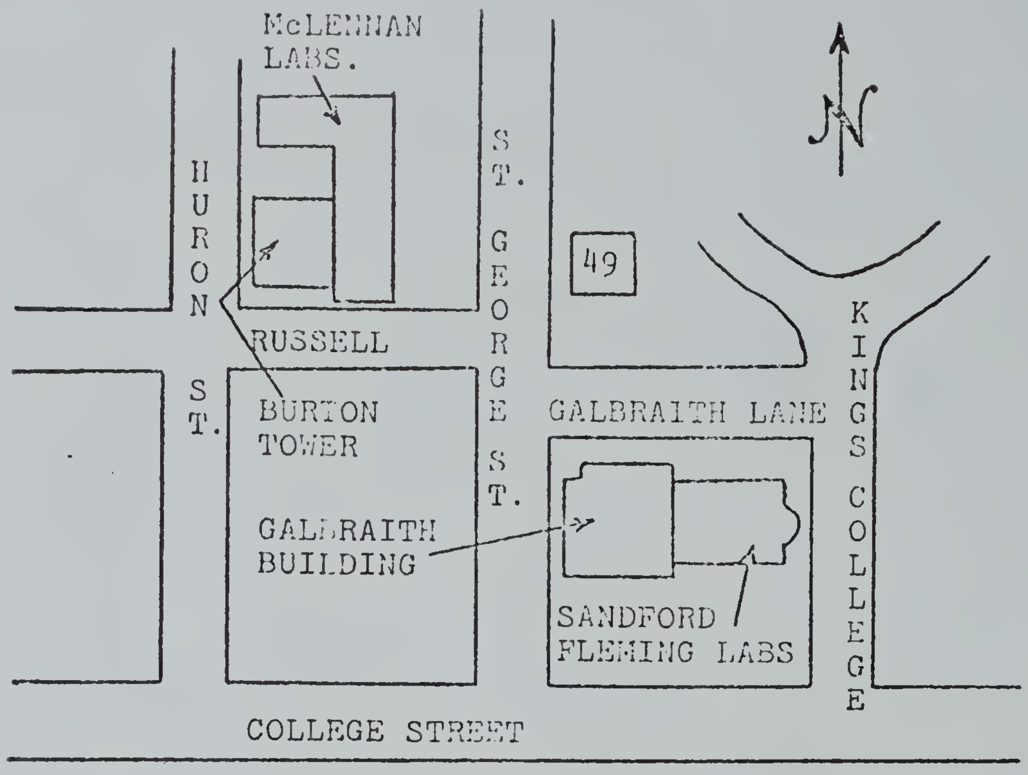
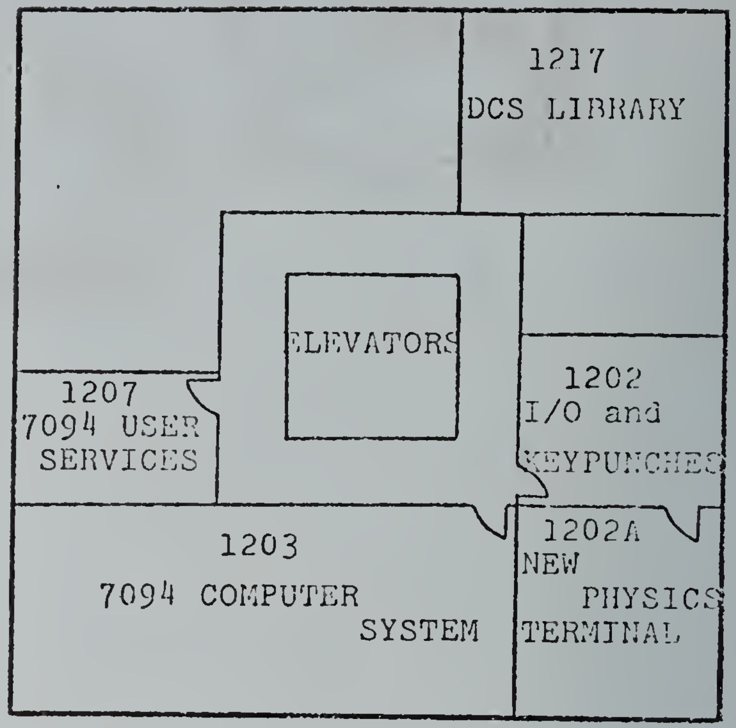
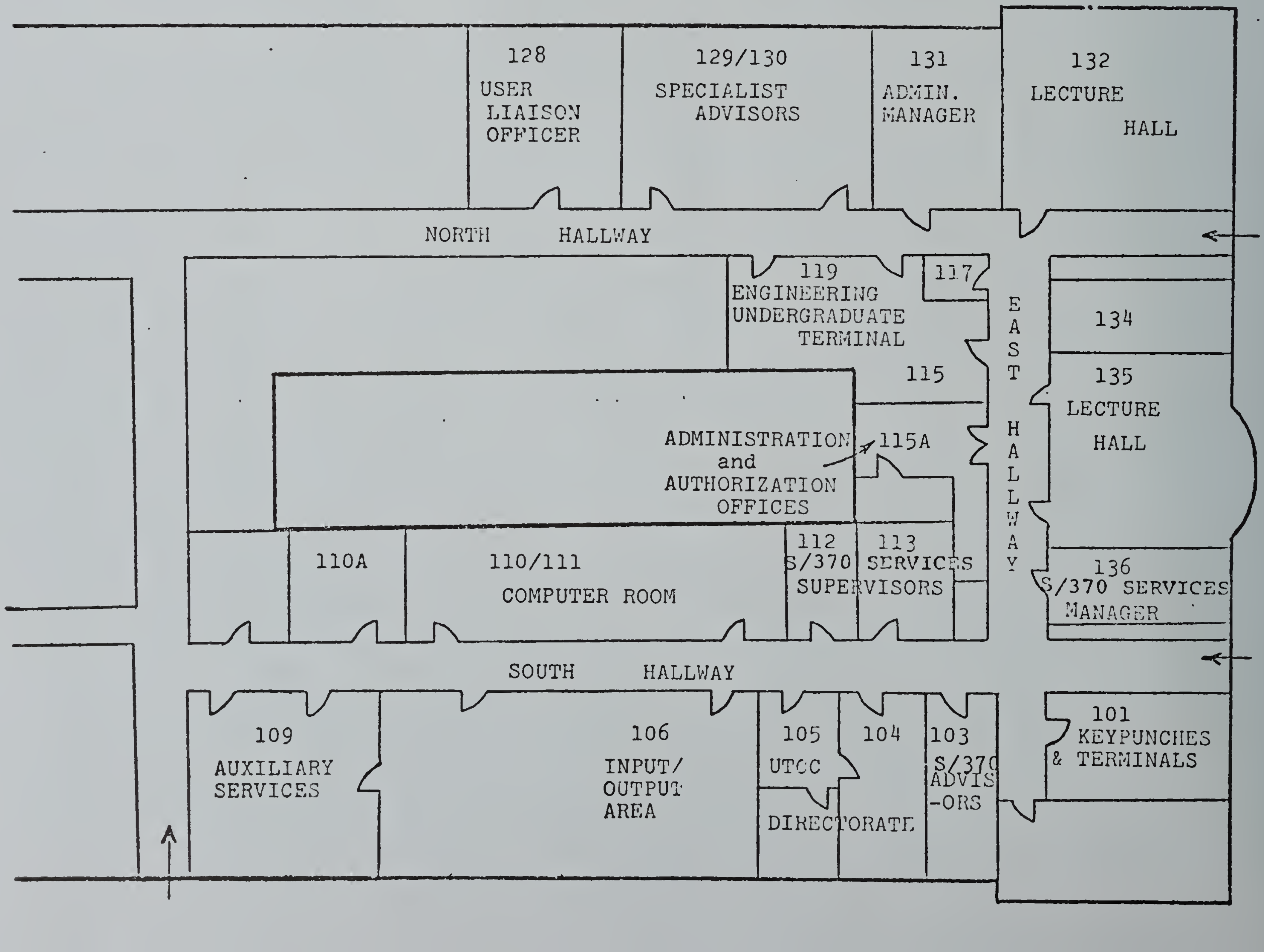




FLOOR PLAN: 12th FLOOR BURTON TOWER

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE
SANDFORD FLEMING LABORATORIES



THE SALVAGE OF BITS AND BYTES

C. A. Ford

Perhaps because of a few false starts and blunders by our Physical Plant Department, we have a credibility problem concerning the recycling of paper and cards through our scrap bins labelled Bits and Bytes. We are assured by the powers that be that the salvageable paper products are in fact being segregated from normal garbage as we have all hoped.

With that settled, imagine our chagrin to read a quotation attributed to Arthur Herridge, executive director of the forests divisions of the Ontario ministry of natural resources. Herridge says in a ministry newsletter that trees and forests reproduce, grow, mature and are harvested, if not by man then by natural forces. So the trees should be used or they will be wasted in the natural course of events. Thus, trying to preserve renewable natural resources such as trees may in fact cost more in non-renewable resources than is worthwhile. Herridge also cites the problems of disposing of inks and fillers without polluting water supplies.

Your editor is old enough to have carried out private venture paper drives as a youth, even before the Boy Scouts and Cubs cut in on the act. He just can't believe that recycling of high quality computer paper is not in the best interests of our civilization. The Bits and Bytes buckets remain. Your use of them is greatly appreciated.

GEOLOGICAL SDI SYSTEM IS NOW UP AND RUNNING

Professor F. G. Smith

GESTAR, an information storage and retrieval system developed in the Department of Geology by a team of geochemists, librarians and computer programmers, was injected into circular orbit early in September.

The first booster stage consisted of a collection of substantially all available published information and data in a subject-constrained part of physical chemistry, geochemistry, mineralogy, petrology, inorganic chemistry, solid state chemistry and physics, metallurgy and materials science required for research in several branches of physical geochemistry, and converting each paper, monograph or report into six punched cards containing the author(s), title, source, and up to 18 12-byte descriptors of the subjects treated. This stage took about 12 man-years to complete up to the currently published works. The name of this file is ALKHAL.

The second stage consisted of testing the completeness of retrieval of items of interest from the current even-numbered issues of Chemical Abstracts Condensates by the CAN/SDI service of the National Science Library in Ottawa. Using four search profiles with fine-mesh logical sieves, all items of prime interest are retrieved (at the expense of substantial dilution by items of no interest), printed and received by mail every two weeks. This printout is perforated for bursting into file cards and requires about one man-day per week for editing, obtaining copies from UT library holdings, preparing interlibrary loan requests, xeroxing, indexing for back-up files, descriptorizing and key-punching. Thus the file can be kept up-to-date cheaply and quickly.

The final injection stage was loading the punched-card information (42,168 cards) on a private 2314 disk pack and development of a set of file maintenance and search job packages each made up of modular steps of IBM file service programs, FORTRAN IV, PL/1 and SPITBOL source programs linked by JCL specifications. These were used to search the file and generate a thesaurus of actual descriptors and to detect and correct errors of several kinds. The search jobs are open-ended since the file is in uncoded text form; job packages for conjunctive or disjunctive searches with either unweighted or positive and negatively weighted descriptors are available. The execution times in the S/370-165 CPU depend on the search strategy, but the ball-park figure is about 30 micro-seconds per descriptor-record, or about 3 seconds for a hop-skip-and-jump type of profile to about 7 seconds for a large and highly selective logical search using cumulative weights of hits and a critical weight for retrieval. The number of descriptors per logical term, the number of terms in the search profile, and the number of items retrieved, are all unlimited.

The final printout is in standard bibliographic style (with or without the associated descriptors) in a page-size format suitable for copying for theses, papers, reviews and monographs.

The long-range goal of the GESTAR system is establishing a facility for graduate students and staff, considering a research project in physical geochemistry, to obtain cheaply and quickly a complete and accurate retrospective bibliography of all published material related to the project, published in any country or language, before money and time are irrevocably spent.

Inquiries may be directed to :

Professor F.G. Smith,
Dept. of Geology,
Room 214,
Mining Building.

Telephone: 928-8841.

INTERGOVERNMENTAL BUREAU FOR INFORMATICS-IBI/ICC

Two copies of the Advance Programme of the IBI/ICC First World Conference on Informatics in Government have arrived in the Editor's office. This conference will take place in Florence, October 16-20, 1972. Anyone interested in the programme may see a copy in Room 105, Sandford Fleming Labs.

PERSONNEL CHANGES

J. Schick

New to the Computer Centre this month are Lawrence Lubin, Sandy Siba and Jeremy Skinner.

Lawrence Lubin is replacing Bob Evans who has left the Centre for employment elsewhere.

Sandy Siba is working for Administration and is the new telephone operator. Lynne Jenkins has been relieved of this duty and is now devoting all of her time to being a clerk-steno for User Services.

Jeremy Skinner is replacing Gordon Brown who left the 7094 to return to school.

Pamela Kellett has moved from the Liaison Office down to the Director's Office to work with Ann Herring.

NEW ACQUISITIONS IN THE DEPARTMENT OF COMPUTER SCIENCE LIBRARY

Armor, D.J. and Couch, S.A.
The DATA-TEXT primer: an introduction to computerized social data analysis using the DATA-TEXT system.
Cambridge, Mass., Howard University.

Barron, D.W.
Computer operating systems.
London, Chapman and Hall, 1971.

Behzad, Mehdi and Chartrand, G.
Introduction to the theory of graphs.
Boston, Allyn and Bacon, 1971.

Blum, E.K.
Numerical analysis and computation: theory and practice.
Addison-Wesley, 1972.

Breuer, M.A., ed.
Design automation of digital systems. v.1, Theory and techniques.
Englewood Cliffs, N.J., Prentice-Hall, 1972.

Bull, G.M. and Packham, S.F.G.
Time-sharing systems.
London, McGraw-Hill, 1971.

Chacko, G.K.
Computer-aided decision-making.
New York, American Elsevier, 1972.

Colin, A.J.T.
Introduction to operating systems.
London, Macdonald, 1971.

Conference on Linguistics, University of Iowa, Oct. 1970.
Proceedings, ed. by R.H. Oehmke and R.S. Wachal.

Dorn, W.S. and McCracken, D.D.
Numerical analysis with FORTRAN IV case studies.
New York, Wiley, 1972.

Greenberg, S.
GPSS primer.
New York, Wiley-Interscience, 1972.

Greub, W.H.
Linear algebra. 3d ed.
New York, Springer-Verlag, 1967.

Hillier, F.S. and Lieberman, G.J.
Introduction to operations research.
San Francisco, Holden-Day, 1967.

Japan-U.S. Seminar on the Learning Process in Control Systems, Nagoya, Japan, 1970.
Pattern recognition and machine learning, ed. by K.S. Fu.
New York, Plenum Press, 1971.

Lyon, J.K.
An introduction to data base design.
New York, Wiley-Interscience, 1971.

Maginnis, J.B.
Elements of compiler construction.
New York, Appleton-Century-Crofts, 1972.

Marshall, C.W.
Applied graph theory.
New York, Wiley-Interscience, 1971.

Meisel, William S.
Computer-oriented approaches to pattern recognition.
New York, Academic Press, 1972.

Organick, E.I.
The Multics system: an examination of its structure.
Cambridge, Mass., M.I.T. Press, 1972.

Ortega, J.M.
Numerical analysis, a second course.
New York, Academic Press, 1972.

Pakin, Sandra.
APL 360 reference manual. 2d ed.
Chicago, Science Research Assoc., 1972.

Rich, R.P.
Internal sorting methods illustrated with PL/1 programs.
Englewood Cliffs, N.J., Prentice-Hall, 1972.

Rose, Alan.
Computer logic.
New York, Wiley-Interscience, 1971.

Rothman, S. and Mosmann, C.
Computers and society: the technology and its social implications.
Chicago, Science Research Assoc., 1972.

Rustin, Randall, ed.
Debugging techniques in large systems.
Englewood Cliffs, N.J., Prentice-Hall, 1971.

Sackman, H. and Citrenbaum, R.L., eds.
Online planning: towards creative problem-solving.
Englewood Cliffs, N.J., Prentice-Hall, 1972.

Symposium on Automatic Demonstration, Versailles, 1968.
  Symposium on Automatic Demonstration, ed. by M. Laudet et al.
Berlin, Springer-Verlag, 1970.

Symposium on Computers and Automata, New York, 1971.
  Proceedings.
Brooklyn, N.Y., Polytechnic Press, 1971.

Van Tassel, D.
  Computer security management.
Englewood Cliffs, N.J., Prentice-Hall, 1972.

Wilks, Y.A.
  Grammar, meaning and the machine analysis of language.
London, Routledge and Kegan Paul, 1972.

Yourdon, E.
  Design of on-line computer systems.
Englewood Cliffs, N.J.,Prentice-Hall, 1972.

DISTRIBUTION OF INPUT/OUTPUT LOAD

C. A. Ford

Computer users at the University of Toronto were among the first to be provided with input/output facilities to major computers remote from the main computer room. Computer terminals at New Physics, the Sidney Smith Building, Erindale and Scarborough Colleges, and the Institute for Aerospace Studies have been operational for a number of years. In the past year we have added a terminal at the Faculty of Management Studies and very recently the IBM 1130 at the Faculty of Dentistry became a terminal to the S/370. In addition, we are equipped to exchange work with computers at other Universities or Data Centres.

The local input/output facilities at the Computer Centre have been utilizing three high speed printers. A fourth one is being added this month. The local input/output equipment handles approximately 70% of all work. Figure I below shows that this has been a decreasing proportion of the total volume during the past year or more.

Figures II, III and IV show the percentage of load borne by the New Physics, Arts & Science, and Management Studies terminals during the same time span. These three terminals have accounted for 19% of the balance of the load. The final 11% has been distributed over the other three terminals.

The general increase in loads at the busier remotes, especially during peak school year times, has led to the replacement of their original equipment with higher speed DATA 100 Model 78 terminal processors. The changes should materially improve the turnaround at those terminals in the coming busy season.

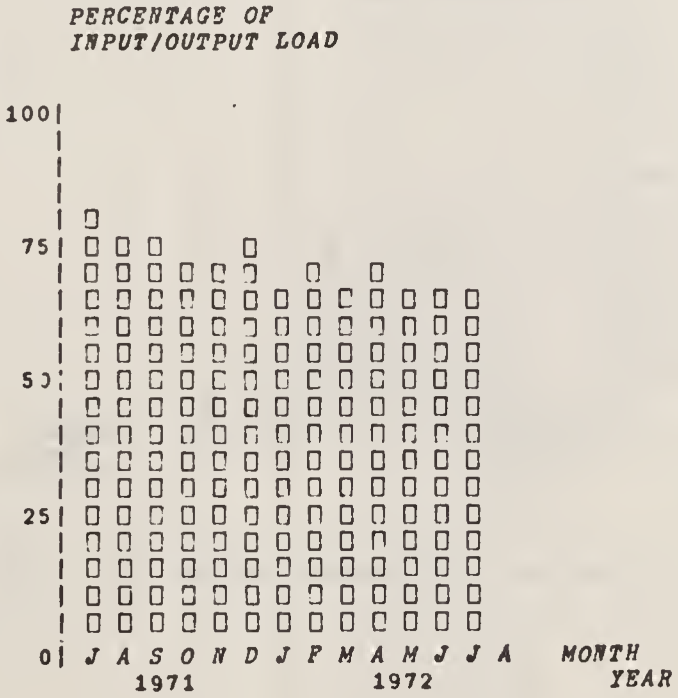


FIG. I LOCAL INPUT/OUTPUT

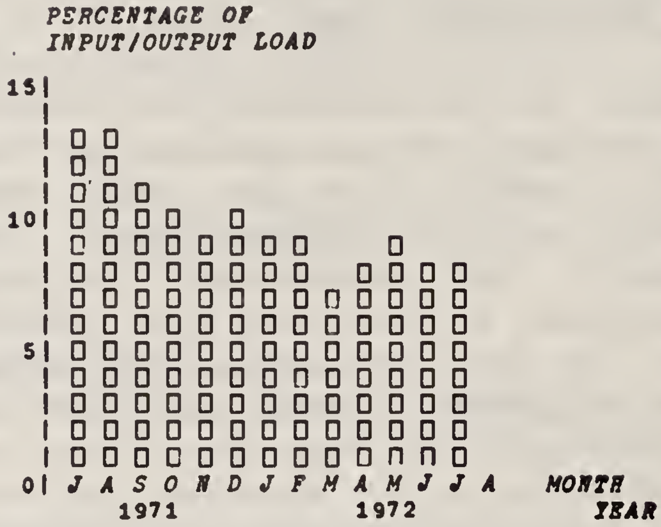


FIG.II NEW PHYSICS I/O

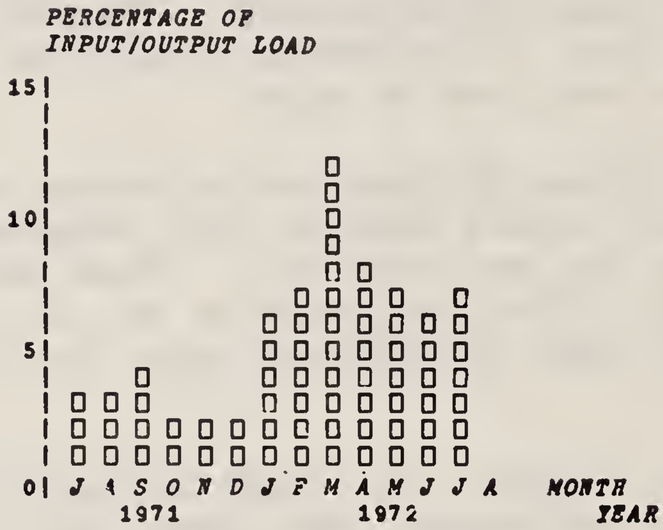


FIG.III ARTS AND SCIENCE I/O

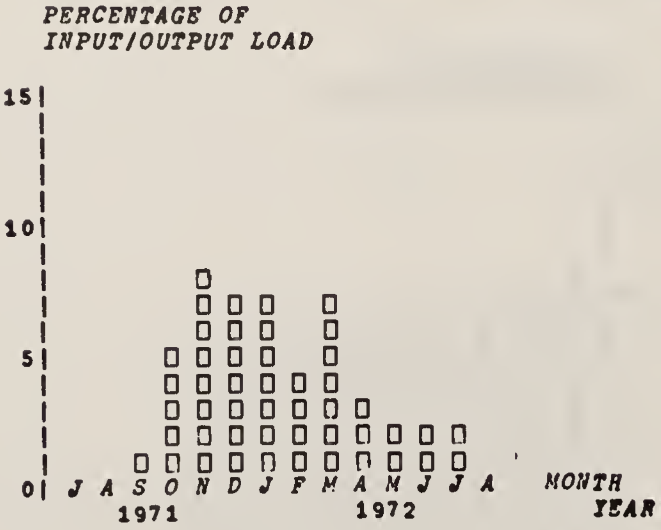


FIG.IV MANAGEMENT STUDIES I/O

PRODUCTION STATISTICS FOR HSJS

J. Lees

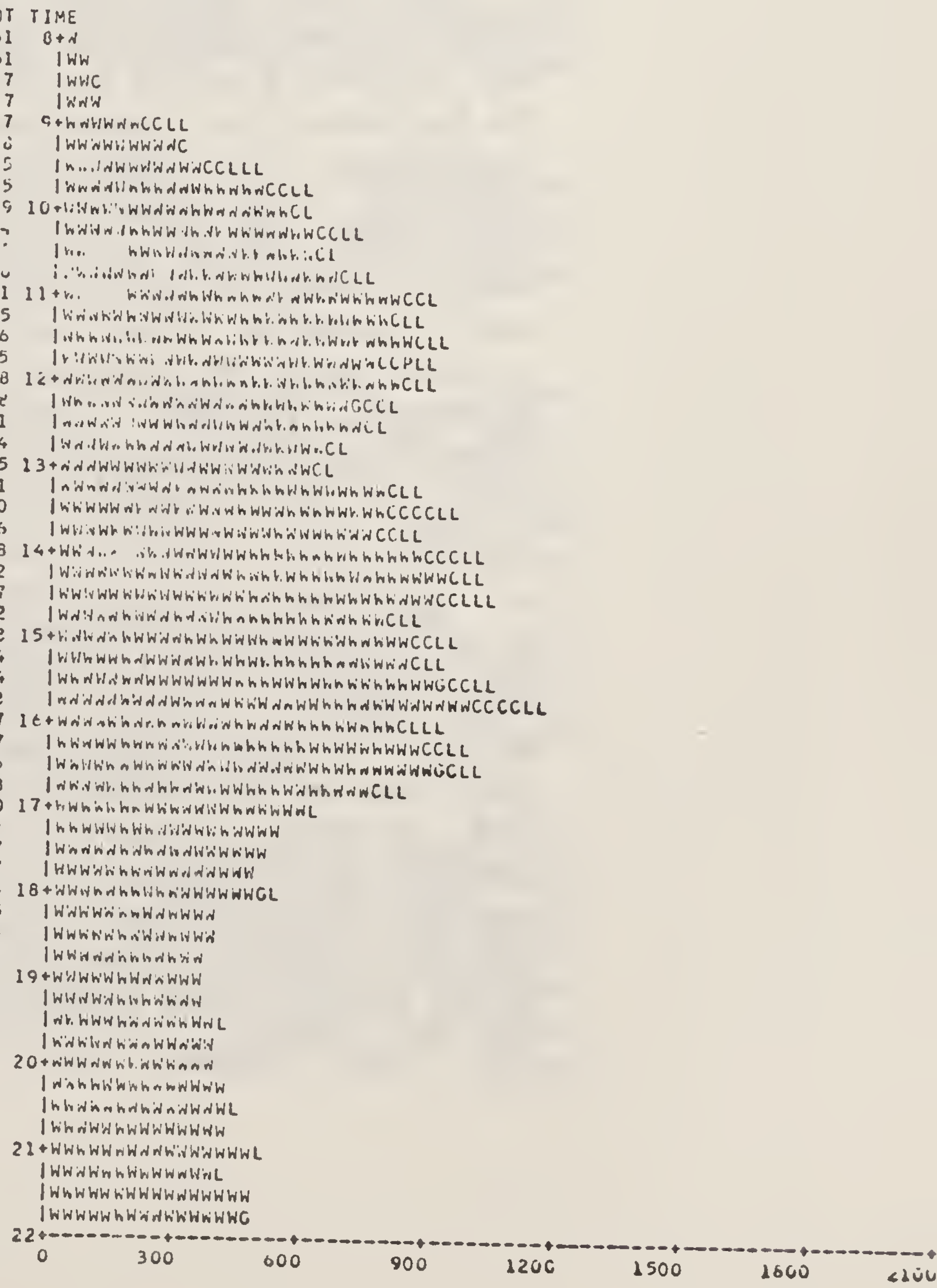
The accompanying histogram shows the total number of jobs processed through the High Speed Job Stream during the month of August.

Recall that the types of jobs are:

WATFIV(W), ALGOL(G), PL/C(C),
ASMG(A), SIMON(S), and LIST(L)

Fifty-six percent of these jobs were run at EUT and thirty-five percent were run at ASUT. During August, only 39,659 jobs were processed on the HSJS, a decrease of 72,583 jobs from the number processed during a peak school period, the month of March. The relative uses of the different subprocessors (i.e. WATFIV, ASMG) has remained fairly constant, with WATFIV accounting for eighty-two percent of the jobs processed. The LIST facility use has greatly increased, from two percent to seven percent of the total number of jobs.

The use of HSJS (with a turnaround of less than 2 minutes) is expected to increase greatly this fall with the addition of the SPITBOL sub-processor and the return to classes.



```
ALL     JOB SUMMARY   ************   FOR 01-310872
    W      G       C       P       A       S       L     TOT  TIME
   40      5       4       0       0       0      12      61   8+
   75     19      22      14       2       1      28     161    |
   66      6      39       0       0       0      16     127    |
   98      8      21       0       0       0      20     147    |
  188     15      76       8      14       2      64     367   9+
  273     12      53       1       1       0      28     368    |
  358     14      69       0       6       0      98     545    |
  500     17     115       1       4       0      38     675    |
  549      9      47       0      10       0      54     669  10+
  609     20      64       0       7       2      72     774    |
  613     15      45       0       5       4      34 [illegible] |
  686     17      57       1      10       2      61     834    |
  810     28      75       2      15       0      51     981  11+
  781     23      43      23      10       0      65     945    |
  845     22      35       4      21       0      78    1006    |
  741     10      64      39      19       0      67     955    |
  826     19      57       1      15       0      60     978  12+
  712     35      61       2      17       0      51     878    |
  745     17      49       0      11       0      49     871    |
  654     29      33       0      13       0      45     774    |
  621     14      51       0      16       0      43     745  13+
  799     14      49       2      18       0      69     951    |
  784     14     120      15      11       0      76    1020    |
  762     17      85       7      18       0      67     956    |
  893     16      95       1      17       0      66    1088  14+
  942      8      43       2      15       0      72    1082    |
  927     20      89       0       7       0     104    1147    |
  793     15      47       4      11       0      62     932    |
  857     27      83      22       9       1      69    1068  15+
  860     20      40       0       9       1      84    1014    |
  903     37      86      23       9       0      76    1134    |
  997     28     134       2      12       4      61    1238    |
  823     21      58       3       8       4      90    1007  16+
  873     21      63       4      11       0      95    1067    |
  919     30      32       4      11       2      78    1076    |
  754     21      31       0       4       0      88     898    |
  625     15      22       0       9       0      39     710  17+
  546     19      25       0       5       0      27     622    |
  532     14      22       1       4       0      24     597    |
  501     16      10       2       7       0      21     557    |
  486     36      12       0       3       0      37     574  18+
  396     21      18       0       4       0      26     465    |
  399     23      15       3       3       0      12     455    |
  373     29      14       3      14       0      23     456    |
  360     29       2       2      20       0      29     442  19+
  367     20       6       0      18       0      27     438    |
  419     27      11       1       6       0      38     502    |
  391     18      10       0       3       0      27     449    |
  418     15      17       0       2       0      25     477  20+
  446     14      17       1       0       0      28     506    |
  431     11      17       1       0       0      32     492    |
  424     13      14       0       7       0      25     483    |
  489     17      18       0       0       0      31     555  21+
  414     20      18       0       1       0      44     497    |
  508     20       9       2       6       0      23     568    |
  456     33      10       1       2       0      27     529    |
----- ------ ------ ------ ------ ------ ------ ------  22+---------+---------+---------+---------+---------+---------+---------+
32695   1073    2425     202     480      23    2761   39659    0        300       600       900       1200      1500      1800      210
```

SYSTEM PERFORMANCE WITH MODEL 3330 DISK DRIVES

C.A. Ford

Four spindles of 3330 disk storage have been added to the S/370-165 computer replacing eight 2314 spindles. The 2314 unit has been moved to the Interactive System/360 where it will help meet a growing demand for online disk storage space.

In last month's newsletter we predicted boldly that the user might find a reduction in his job costs from the advent of the 3330 disks. Having run a controlled experiment on this subject, we must now blush and admit that it doesn't happen. (This is the bad news. See a later paragraph for good news.) In fact, we have been able to compare the cpu and core costs for a set of jobs run in February, in the early summer on Releases 20.1 and 21, and now with the 3330 disk drives. System tuning or the minor variability inherent in S/370 performance appears to have caused a slight increase in the cost of work from February into the summertime. Work worth $246.56 in February would have cost $251.79 on Release 21 with the 2314 drives. The same work would now cost $247.93 on the system equipped with 3330's. We consider these results to be equal within the precision of the experiment.

Now some good news. By means of an experimental run of jobs in low-contention single stream style, it is possible to derive a value for the average wait time per I/O event. We had done this experiment long ago with the S/360-65 computers. At that time we were charging 26.6 msecs. per I/O wait. The experiment indicated that we should in fact have been charging approximately 31 msecs. for each I/O event. When the System/370-165 machine was put into service we discovered that more I/O waits were exposed on the typical user job than had been the case on the earlier machines. In order to sustain a pledge of providing cheaper computing service, we arbitrarily adjusted the 26.6 msecs. down to 24.5 despite the indication from the experiment quoted.

We ran this experiment again with the new S/370 and 2314 drives, reinforcing the finding of 31 msecs. per I/O. We have run it still again since installing the 3330 disk drives. A quick graphical analysis of the results showed that the system became substantially faster with the 3330's. The 31 msecs. should be reduced by 20%, bringing us back almost precisely to the 24.5 figure now incorporated in the system. Furthermore, the system seems to take half the time to initiate and terminate jobs. The overall effect appears to be almost a 30% potential increase in throughput capacity for the system.

A review of prices for the System/370 is to be held soon, under the aegis of the Pricing subcommittee of the Presidential Advisory Committee on Computer Policy and Planning. These changes in system performance will be considered, along with the incremental changes in costs of the computer hardware. This review may lead to changes in the prices charged for the computer resources. Until the review is complete the prices will remain as presently published. The user meanwhile is at least assured of no systematic increase of cost for his work but he will be happy with reduced turnaround time engendered by the new disk units.

APPLICATIONS SOFTWARE - CALCOMP

R. Radcliffe

Users are advised that the CALCOMP plotting routines will be undergoing changes in the coming weeks. These changes are designed to improve the turnaround time (for most users) and to eliminate the CALCOMP job failures that have been occurring. Warning will be given before the first change is made. Load modules containing old plot routines will not work after this change.

Existing load modules containing CALCOMP routines will have to be re-edited with the linkage editor, or recreated by compilation. Users who compile their programs for each execution will not be affected.

At the same time, minor changes will be made to the catalogued procedures. Users having their own catalogued or in-line procedures for CALCOMP will need to apply these changes.

User's Services will also be implementing a more standardized set of CALCOMP routines. One of the major differences between UTCC CALCOMP routines and the standard 360/370 routines is in the calling sequences for LINE and AXIS. This difference can produce problems when trying to implement plotting packages designed for the standard set. Although the old calling sequences will continue to have support, users will be advised to use the standard set, since any software being added to the system will be designed to use the standard calling sequences.

The CALCOMP Graphics Functional Software package will be added to the system. This package consists of subroutines and programs which extend the standard software. A selection of specific capabilities includes drawing circles, ellipses, dashed lines, grids, polygons, log-axes, bar graphs, shading, arrows, polar graphs, and curve fitting.

NEW UTCC MOUNT CHARGES AND VOLUME USAGE

H. Kugel

The UTCC accounting charge algorithm has been modified so that users now pay for mounting charges based on the total number of individual OS mount messages issued for their job, rather than on the flat charge previously used. The new charges are:

$1.00 for each tape mount message issued by the job

$2.00 for each special printer forms mount

$3.00 for each 2316 disk mount message issued

Unless the user is careful with this new algorithm he could be charged multiple mount charges on the same volume in the same job since the normal OS JCL usage of DISP=OLD tells the system to leave the volume mounted unless it (the system) needs the drive for another mount. Thus, for example, if a user had a six step job and used a specific volume only in the first and sixth steps, the system could issue a dismount message for the volume after the completion of the first step, and then issue a second mount message for the volume for the sixth step. Should this happen, the user would be charged twice.

The way to avoid this is to code both the PRIVATE and RETAIN subparameters in the volume parameter of your Data Description statement. The first value indicates to the system that no output dataset will be allocated to this volume unless specifically requested by the user, and that the volume will be dismounted after its last use in the job step unless RETAIN is coded. This indicates that the volume is not to be dismounted after its last use. Instead, the volume remains mounted until after its subsequent use in a following job step (which may also contain a DD statement with RETAIN) or until the end of the job. The way to code this parameter on your DD statement is:

```
VOL=SER=(PRIVATE,RETAIN,,,SER=serial number)
```

This will hold any volume mounted during the entire user's job. This JCL parameter is valid for both magnetic tape and random access storage.

In the area of magnetic tape usage, the user may specify deferred mounting. That is, the system will issue the mount message only when the processing program actually attempts to open the dataset. The tape unit is actually allocated at step initiation time, but the mount message is not issued until the dataset is actually opened by the processing program.

Normally, this can be a very useful debugging aide in that the user will not be charged should his program fail before the dataset is opened, but the user should remember that his program is in memory waiting for the mount to be satisfied and that this "waiting program region" degrades total throughput. A good 'rule of thumb' here might be not to use deferred mounting on programs which have proved successful in the past.

Lastly, in the area of special print forms, the algorithm currently inspects only the output dataset. If, after requesting special forms, the user asks the operator to delete printing, he will still be charged for the special forms mount.

A very good rule here is to debug your program very thoroughly before you request special forms.

SYSTEM STATUS BULLETINS ISSUED

J. Campbell

48:72:1 Hours of Service - Labour Day Weekend
      2 O.S. Release 21.0 Language Processors

49:72 New SORT/MERGE Product SM1

50:72:1 Revised Rate Schedule - Implementation
      2 New Address-Label Utility

51:72:1 New WATFIV $JOB Card
      2 SPITBOL Available on High Speed Job Stream
      3 New Version of WATFIV Available

RELIABILITY OF THE INTERACTIVE SYSTEMS

S. Goldfarb

The following tables summarize the time lost out of scheduled hours of production for the period August 1 through August 31, 1972. The total number of scheduled hours of operation during this period was 517 (including the August 7 holiday). Table 1 shows the time lost due to late starts (IPL's); Table 2 shows the time lost due to system failures for each of the systems. Four unscheduled IPL's were required as a result of the failures. Severe problems with the Large Capacity Storage Unit (LCS) accounted for most of the downtime experienced. The problems were traced to a damaged core array; the extent of the damage was such that the entire core array had to be replaced. The uptime for each of APL, ATS and CPS was 98.29%, 98.24% and 91.84% respectively. In addition to the scheduled hours of operation, APL, ATS and CPS were available during approximately 100, 104 and 87 hours, respectively, of unscheduled weekend time.

DATE	TIME LOST (mins.)			REASON
	APL	ATS	CPS	
Fri. Aug. 4	214	216	395	LCS problems (hardware)
Sat. Aug. 5	21	23	480	(all day) LCS unavailable (hardware)
Sun. Aug. 6	-	-	480	(all day) LCS unavailable (hardware)
Mon. Aug. 7 (Civic holiday)	51	53	967	LCS unavailable (hardware)
Mon. Aug. 21	-	-	47	Damaged disk VTOC (undetermined)
Totals	286	292	2369	

Table 1. Time Lost at IPL

DATE	DOWN TIME (mins.)			REASON
	APL	ATS	CPS	
Fri. Aug. 4	20	24	-	*LCS problems (hardware)
Mon. Aug. 7	71	70	-	*Testing LCS core array Replacement
Tues. Aug. 22	139	141	142	*Power surge induced hardware errors
Tues. Aug. 29	14	18	19	*Power surge
Totals	244	253	161	*IPL required

Table 2. System Failures

INCREASED STORAGE CAPACITY

S. Goldfarb

The on-line storage capacity of the Interactive Systems machine has been increased with the addition of a 2314 Disk Storage Unit received from the System/370 at the beginning of September.

7094 SERVICES

J. Walton

FLUCTUATING WORKLOAD

August has seen a change both in the volume and in the length of jobs submitted, with a decrease in average job length from 15 minutes in June and July to 10 minutes in August and a decrease in hours of processing from 240 to 175. The number of jobs dipped in July but rose again in August to the June level of about 1100. Much of the decrease is attributable to a drop in the number of very long Chemistry jobs since the completion of some of their studies.

USER OPERATORS

Four more Consortium members have qualified as operators, who may use the machine for their own work outside our regular service hours. This brings the total number trained to fourteen, of whom eleven are still with us.

USERBOOK

Section 5 of the Userbook which deals with the 7094 operation will be released in part in September. Please let us know of your suggestions for improvements and extensions.

GENERAL NEWS

J. R. McBride

a) CRF Policy Committee

Dr. D.F. Forster, Vice-President and Provost, has appointed Professor T.E. Hull, Chairman of the Department of Computer Science, as Chairman of the CRF Policy Committee.

Professor Hull succeeds Professor J.N.P. Hume who resigned on July 1st, 1972 to go on sabbatical leave.

A new committee is in the process of being formed and a list of the committee members will be published once appointed.

b) Staff Changes

We are pleased to announce that Mr. Harry Cowan has joined the 360 Operations Section as an operator. Mr. Cowan was formerly at Humber College.

c) Pricing Change for the PDP-8/I

The cost of computing on the PDP-8/I system has been modified for jobs running more than two hours.

Under the new charging scheme, computing time up to two hours will be charged at 40 units per hour and time over two hours will be charged at 20 units per hour.

The new rates will be:

Normal Rates	40 units per hour
Extended Use (i.e. over 2 hours)	20 units per hour
Teaching Rates	20 units per hour

Teaching rates include a free CRF Training Course and are restricted to five hours per student per course.

d) Analog/Hybrid System

The software for use of the AD/4 - 360/44 hybrid system is almost completed. Anyone wishing information on this system should contact D.R. Smith, Room SF 2740, or telephone 7133.

e) Thanksgiving Holiday

The CRF Offices and laboratory will be closed on Monday, 9th October, 1972 for the Thanksgiving Holiday.

The CRF laboratory will close at 8:00 p.m. on Friday, 6th October, 1972 and will reopen at 9:00 a.m. on Tuesday, 10th October, 1972.

VISITORS TO THE LABORATORY

The following people visited the CRF lab. between August 18th and September 21st: Mr. Bill Verburgt (IBM Canada Ltd.), Mr. Norm Quinton (IBM Canada Ltd), Professor W.J. Hanser (University of British Columbia), Professor Henry Sutcliffe (Salford University, U.K.), Professor D. Blanchard (U.B.C.), Mr. M. Herak (Zagreb, Yugoslavia), Kathleen J. Taylor and J.M. Taylor (Dublin, Ireland), Vivien E. Taylor (Toronto), G.M. Lowes (St. Lawrence College, Kingston), Dr. A. Kurec (Warsaw Technical University, Poland), Professor R.L. Hummel (Department of Chemical Engineering, Toronto), a party of thirty graduate students from the Department of Computer Science, Mr Conrad Maheux and Mr. John Leppik (IBM Canada Ltd.), Mrs. E. McGann and Dr. Allen Baker (Royal Ontario Museum).

DATA ACQUISITION SERVICES AT CRF

CRF, as a part of its charter, is setting up a centralized data acquisition service. This service is intended to provide data acquisition equipment and experienced personnel for the University's researchers.

The equipment available now (and in the future) consists of centralized computers accessable over telephone or dedicated lines, and a variety of portable equipment available for use in the researcher's own laboratory.

CRF also provides experienced personnel for consulting and programming, and for the interfacing and maintenance of the equipment.

A brief summary of existing and future facilities in this area is given below. If you are interested in using any of the facilities mentioned or have any suggestions on their development, we would be pleased to hear from you.

You can help CRF in providing for your needs by completing and returning the survey on the last page of this section.

If you have any questions you should contact T.C. Stevens at 928-8853, or J.R. McBride at 928-4086.

a) Facilities Available Now

The following data acquisition facilities are currently available:

1) RADDT (Remote Analog Digital Data Terminal)

The RADDT is connected on-line to the 360/44 and provides up to eight channels of high speed analog-to-digital and digital-to-analog conversions at conversion rates up to 20,000 per second. Digitized data may be recorded up to 20,000 per second. Digitized data may be recorded on digital magnetic tape for later analysis, or analyzed immediately using FORTRAN routines on the 360/44.

2) Ana-log 7 Portable Analog Tape Recorder

This is a seven channel recorder which records in either a direct or FM mode on any channel. The frequency response for each channel is:

i)	FM record/reproduce	DC-10,000 HZ
ii)	direct record/reproduce	250-100,000 HZ

b) Future Facilities

The following facilities are planned for implementation in early 1973:

1) On-Line Data Acquisition Terminal

This terminal will operate on-line to a PDP-11/05 computer with 32K bytes of core memory, a 29 million byte disk, and a port to the Star-Ring interface system which will give it access to the 360/44.

The terminal will have eight channels of analog-to-digital and digital-to-analog conversion. It will operate in one of three modes:

- acoustically coupled through a standard telephone. This will provide slow speed data acquisition with a maximum conversion rate of 15 samples per second.

- directly connected to a standard telephone line. This will provide slightly faster throughput with conversion rates up to 120 samples per second.

- directly connected to a dedicated 4-wire line which terminates at the PDP-11/05 in the CRF lab. This will provide up to 2500 conversions per second.

2) Hewlett Packard 3960A Analog Tape Recorder

This is a four channel portable FM record/reproduce unit which has a frequency response of DE to 5000 HZ.

3) TEAC R-70 Portable Analog Tape Recorder

This is a very small four channel recorder which uses cassette tapes. It can record/reproduce in either a direct or FM mode on any channel. It operates from 110 v.a.c. or 12 v.d.c. The frequency response is:

i)	FM record/reproduce	DC to 625 HZ
ii)	direct record/reproduce	100 HZ to 8KHZ

UNIVERSITY OF TORONTO

COMPUTER RESEARCH FACILITY

DATA ACQUISITION SURVEY

Return to: Computer Research Facility,
Room SF 2740,
Sandford Fleming Labs.,
Attention: T.C. Stevens.

NAME: TELEPHONE:

DEPARTMENT:

1. Which of the following systems will be of use to you?

    - RADDT (Remote Analog and Digital Data Terminal) __
    - On-line Data Acquisiton Terminal __
    - Ana-log 7 Analog Tape Recorder __
    - Hewlett Packard 3960A Analog Tape Recorder __
    - TEAC R-70 Analog Tape Recorder __
    - Please send more information __

2. Which of the following services will be of use to you?

    - Program consulting __
    - Program writing __
    - Interface consulting __
    - Interface construction __
    - Equipment Maintenance __
    - Please send more information __

3. Do you have any comments on the services described above?

4. Do you have any suggestions for data acquisition facilities or services that you think CRF should provide?

UTCC DIRECTORY

	ROOM	PHONE 928-
DIRECTOR		
John C. Wilson	SF105	6496
ASSISTANT DIRECTOR		
C. Alan Ford	SF105	2991
USER LIAISON OFFICER		
Bill Greene	SF128	2694
Information Office	SF134	4990 or 4991
ADMINISTRATION MANAGER		
Jerry Palter	SF131	8948
AUTHORIZATION CLERKS		
Nancy Pocock (S/370 + 7094)	SF115A	8702
Yvonne Davis (Interactive)	49 St.Geo	8703
S/370 SERVICES		
MANAGER		
Dave McNaughton	SF136	6281
INPUT/OUTPUT SUPERVISOR		
Roy Finlayson	SF112	7092
USER SERVICES SUPERVISOR		
Stan Yagi	SF112	7331
PROGRAM ADVISORS	SF103	8599
INTERACTIVE TERMINAL SYSTEMS		
MANAGER		
Sam Goldfarb	49 St.Geo	3787
7094 SERVICES		
MANAGER		
Joyce Walton	BT1207	7094
DEVELOPMENT MANAGER		
Alan Wickens	49 St.Geo	6135

JOB STATUS QUERIES:

SYSTEM/370	7373
7094	7094
Auxiliary Services	6465

INTERACTIVE TERMINAL SYSTEMS:

System Status	6234
APL	7200
ATS	7100
CPS	6200

CONVERSATIONAL REMOTE JOB ENTRY (CRJE)

2741 7233 7381 7386

TTY 7445

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 106/110/111
- provides General Purpose Job Stream and High Speed Job Stream services
- 2048K bytes of core
- 8 disk drives IBM (2314)
- 4 disk drives IBM (3330)
- 1 drum
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 6 printers
- 4 card readers
- 2 card punches
- 7 remote batch terminals
- 1 paper tape reader

- OS/MVT with HASP and CRJE

(b) SYSTEM/360 MODEL 65

- located in Room 333 McLennan Physical Laboratories
- provides Interactive Systems Service
- 1536K bytes of core
- 16 disk drives (2314)
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 100 typewriter terminals

- OS/MVT with APL, ATS, and CPS

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

UTCC AUXILIARY EQUIPMENT

- located in SF 109
- System/360 Model 20 for unit record services
- CALCOMP plotter (11" and 30")
- card sorter
- decollator
- 519 reproducing punch
- UNIVAC 1710 interpreting keypunch

UNIVERSITY OF TORONTO
COMPUTER CENTRE,
TORONTO, CANADA.